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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/668,559

09/22/2003

Ralf Zuber

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EXAMINER

ONEILL, KARIE AMBER

ART UNIT

PAPER NUMBER

1795

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DELIVERY MODE

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PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/668,559	<b>Applicant(s)</b> ZUBER ET AL.	
	<b>Examiner</b> Karie O'Neill	<b>Art Unit</b> 1795	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 23 February 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-14 is/are pending in the application.
- 4a) Of the above claim(s) 7,8,11 and 12 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 9-10, 13-14 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Request for Continued Examination***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on February 23, 2009, has been entered.

Claims 1 and 9 have been amended. Claims 7-12 and 14 have been withdrawn from consideration as being drawn to a non-elected group. Claim 9 has been amended to depend from Claim 1, therefore, Claims 1-6, 9-10 and 13-14 are pending in this office action.

### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 5-6 and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Steck (EP 0586461 B1).

With regard to Claims 1 and 13, Steck discloses in Figure 4, a catalyst-coated membrane, for use in a solid polymer electrolyte fuel cell, comprised of:

(a) an ionomer membrane (16), wherein said ionomer membrane comprises two surfaces (page 2 lines 13-15) and each of said two surfaces is comprised of:

- (i) an active area formed by coating a portion of the surface with a catalyst layer on an anode and cathode (page 2, lines 16-19), and
- (ii) a passive area which extends beyond the electrochemically active region (page 2 lines 27-30); and

(b) at least one layer of protective film, or a gasket (12, 14), attached to each of the two surfaces of said ionomer membrane (16) (page 4 lines 45-46), wherein said at least one layer of protective film overlaps the passive area and the active area of each surface and wherein a layer sequence of membrane-catalyst layer-protective film (gasket) is formed in a region of each active area (See Figure 4 and page 5 lines 29-36).

The phrase "formed by coating" is a process term in a product claim. Product-by-process claims are not limited to the manipulations of the recited steps, only the structure implied by the steps. "Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." See *MPEP 2113*. The prior art teaches a layer, as noted.

Art Unit: 1795

With regard to Claim 2, Steck discloses in Figure 4, wherein the passive area (16b) forms a perimeter around said active area (18, 20) ( page 3 lines 52-57 and page 5 lines 29-36).

With regard to Claim 3, Steck discloses wherein 86% of the membrane is utilized as a cation exchange site with catalyst coating, and the region of the passive area that is overlapped by the protective layer is about 100%, as can be seen in any of Figures 3-6 wherein the active area is that which is covered by the catalyzed electrode (18, 20) (page 6 lines 11-15).

With regard to Claim 5, Steck discloses wherein the organic polymer material comprises a non-hydrophilic thermoplastic elastomeric material (page 3 line 36), including a butadiene/styrene copolymer and ethylene/propylene copolymer (page 5 lines 12-15).

With regard to Claim 6, Steck discloses wherein the ionomer membrane comprises a substance selected from the group consisting of a solid polymer ion exchange membrane, typically a porous, sulfonated material (page 3 lines 35-36).

### ***Claim Rejections - 35 USC § 103***

4. The rejection of Claim 4 under 35 U.S.C. 103(a) as being unpatentable over Steck (EP 0586461 B1), as applied to Claims 1-3, 5-6 and 13, and in further view of Spencer (WO 00/10216), has been overcome based on the amendments to the claims.

Art Unit: 1795

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4, 9-10 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steck (EP 0586461 B1), as applied to Claims 1-3, 5-6 and 13 above, and in further view of Fukuoka et al. (JP 10-154521).

Steck discloses the catalyst coated membrane in paragraph 3 above, but does not disclose wherein at least one layer of protective film comprises an organic polymer with a thickness in the range of 10 to 150 microns, at least one gas diffusion layer, wherein said at least one gas diffusion layer covers at least a portion of the active area of said catalyst-coated membrane and contacts, overlaps and/or penetrates the at least one layer of protective film of the catalyst-coated membrane, and wherein the region of the gas diffusion layer contacted by the at least one layer of protective film is in the range of 0.5 to 50% of the total area of the gas diffusion layer.

Fukuoka et al., however, discloses in Drawings 1-4, a polymer fuel cell comprising an ionomer membrane (1), a catalyst layer (2) formed on both sides of the ionomer membrane to form an active layer, a gas diffusion layer (3) covering at least a portion of the catalyst active layer (2), and a protective film, called a reinforcing film (7), having a frame shape arranged on one or both sides of the catalyst layer (2) and the gas diffusion layer (3) (paragraphs 0018-0020). The protective film, or reinforcing film (7), is made of a fluororesin and has a thickness of 50 micrometers (paragraph 0026).

Art Unit: 1795

The protective film also has a size of 45mmx45mm, and the inner circumference of the reinforcing film (7) might lap with the periphery section of the catalyst layer (2) by about 5mm (paragraph 0029 and Drawing 4), and as can be seen in the drawings, the region of the gas diffusion layer contacted by the protective film (7) is in a range of 0.5 to 50% of the total area of the gas diffusion layer (3).

Based on the teachings of these references, it would have been obvious at the time of the invention to use a gas diffusion layer which covers at least a portion of a catalyst layer and makes contact with a protective film having a thickness of 50 mm as part of the catalyst coated membrane of Steck, because Fukuoka teaches the protective film prevents breakage of the membrane without decreasing the effective area of an electrode and membrane, prevents breakage of the protective film at the time of assembly and creates a seal (paragraph 0015), as well as, the gas diffusion layer facilitates proper humidification of the membrane of the fuel cell (paragraph 0017). Further, Fukuoka et al. discloses that the gas diffusion layer will allow for the reactants to diffuse to the catalyst layers to generate electricity.

### ***Response to Arguments***

7. Applicant's arguments filed February 23, 2009, have been fully considered but they are not persuasive.

Applicants argue that, "Steck discloses a different type of MEA technology based on the use of gas diffusion electrodes (or catalyst-coated GDLs) in combination with non-coated ionomer membranes. In contrast, the present invention is directed towards

Art Unit: 1795

catalyst-coated membranes (CCMs) in which the membrane is coated with catalyst layers on both sides. This CCM is optionally combined with GDLs to form a five-layer MEA."

This argument is not persuasive. Steck discloses the catalyst coated membrane in paragraph 3 above. In Steck, a catalyst layer is disposed on the anode and cathode electrodes and further joined to the polymer membrane. The end result is a catalyst coated membrane, since the catalyst layer of the anode and cathode electrodes is making contact with the membrane layer. As Applicant states, the gas diffusion layer is optional, and in Steck, the gas diffusion electrode is present between the gas flowing from the manifold and the catalyst layer.

Applicants argue that, "Steck does not disclose an ionomer membrane having a surface comprising an "active area," as defined in the present application.

This argument is not persuasive. In paragraph 3 above, Steck discloses a catalyst layer, which is an "active area", disposed on the anode and cathode electrodes and further joined to the polymer membrane. The end result is a catalyst coated membrane, since the catalyst layer of the anode and cathode electrodes is in contact with the membrane layer.

Applicants argue that, "in Figures 1 and 2 of Steck, the protective film 12, 14 is placed between the membrane and the electrode layers, thus isolating a portion of the catalyst layers from the membrane and making the active area smaller. Therefore, the protective film does not overlap the active area but is merely adjacent to it. Because the layer sequence of the presently claimed invention is different than that of Steck, the



Art Unit: 1795

CCM structures of the present invention are different than the structures disclosed in Steck."

This argument is not persuasive. Figures 1 and 2 are embodiments of Steck that show all of the claimed features of the instant invention. However, as disclosed in paragraph 3 above, Figure 4 of Steck is the embodiment relied upon to teach that the protective film (12,14) does overlap the active area (18,20) at regions (18b,20b). Therefore, Steck does disclose the same structure as the present invention.

Finally, Applicants argue that, "the present invention results in an MEA having sufficient overlap of the protective film and the passive and active areas of the membrane. This kind of combined overlap is advantageous for the following reasons: The claimed CCM withstands frequent assembly and disassembly processes without damages (see Example 1, final sentence), and the MEA made thereof showed no damage after 300 hours of operation (see Example 2)."

The alleged "advantageous reasons for combined overlap of the protective film and the passive and active areas of the membrane" are not claimed features of the instant invention. Limitations appearing in the specification but not recited in the claim are not read into the claim. See MPEP 2106.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Karie O'Neill whose telephone number is (571)272-

Art Unit: 1795

8614. The examiner can normally be reached on Monday through Friday from 8am to 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark Ruthkosky/  
Primary Examiner, Art Unit 1795

Karie O'Neill  
Examiner  
Art Unit 1795

KAO